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10/820,157

04/08/2004

Dong-woo Lee

249/459

7040

27849

7590

06/22/2006

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ARLINGTON, VA 22209

EXAMINER

FORD, JOHN K

ART UNIT

PAPER NUMBER

3753

DATE MAILED: 06/22/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | | |
|------------------------------|-------------------------------|----------------------------|--|
| Office Action Summary | Application No. 10/820,157 | Applicant(s) LEE ET AL. | |
| | Examiner John K. Ford | Art Unit 3753 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 6/8/06
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-18, 21 and 22 is/are pending in the application.
- 4a) Of the above claim(s) 6, 8, 14, 15, 17 and 18 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1, 3, 9, 10, 16, 21 and 22 is/are rejected.
- 7) ☒ Claim(s) 11-13 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

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Applicant's response of June 8, 2006 has been considered carefully. No claims have been amended. Is that correct? Applicant's comments are addressed below in the order presented by applicant.

A. August 23, 2004 IDS

The Examiner did consider all of the English Abstracts submitted by applicant. The reason that the phrase "w/English Abstract" was crossed out was that the examiner did not want the PTO contract printer to print that phrase on the patent. In the future, please make such annotations in the margins of the IDS not in the area reserved for the foreign patent document identification numbers.

B. Introduction

Applicant correctly states the rejections.

C. D. and E. The obviousness rejections

Applicant asserts that the heater must heat a top surface of the heat pipe by heating the working fluid. **Claim 1 does not state that the heater must heat the top surface of the heat pipe by heating the bottom surface of the heat pipe and having that heat absorbed by the working fluid and then transferred to the top**

surface. Thus, it is apparent that applicant's argument is incommensurate with the scope of the claims.

Applicant simply claims "a heater for heating the top surface [of the heat pipe] by heating the working fluid." Functional statements are treated consistent with MPEP 2114, incorporated here by reference. To summarize what is stated there, apparatus claims cover what a device *is*, not what a device *does*. A heater 24 is clearly shown in JP '293 and it clearly heats to top surface of the heat pipe, applicant's suggestions to the contrary notwithstanding. The heater heats the working fluid in the heat pipe, turning it to vapor 112. Furthermore, this vapor 112 heats all of the surfaces inside of the heat pipe. The question becomes, in an apparatus claim does one give patentable weight to the functional recitation of the intended manner of operating the heater. The answer is no. See MPEP 2114 'MANNER OF OPERATING THE DEVICE DOES NOT DIFFERENTIATE APPARATUS CLAIM FROM THE PRIOR ART', incorporated here by reference. Moreover, assuming, *arguendo* that the functional recitation of the intended manner of operating the heater were given weight, the heater does, in fact, heat the top surface of the heat pipe by heating the working fluid. The heater 24 transfers heat to the working fluid immediately below the heater. That fluid vaporizes. If the outer peripheral edge of the susceptor 22 (i.e. the portion not immediately adjacent the heater 24) and the adjoining upper surface of the heat pipe is cold, that vaporized working fluid will condense on the upper surface of the heat pipe in the vicinity of that cold spot and heat it up. Thus, "a heater for heating the top surface [of the heat pipe] by heating the

working fluid' is disclosed by JP 5-315293, applicant's remarks to the contrary notwithstanding.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 2, 3, 9, 10, 16 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combined teachings of Komino (JP 5-315293) and Shlosinger (USP 3,543,839) and optionally Oi (JP 8-29080).

Komino in Figure 5 shows a heat pipe (40A), a wafer W, a heater (24), a wick (96), a predetermined amount of working fluid (42), a cooling system (in the vicinity of and surrounding elements 44 and 40c) and connection pipes (122 and 124). No valve is shown in either of the connection pipes.

Shlosinger teaches in a heat pipe structure identical to the one shown in Figure 5 of Komino, the advantage of using a valve (26 or 78) in the connection pipe between the evaporator section (corresponding to 40A of Komino) and the condenser section (corresponding to 40c of Komino) for the purpose of allowing improved control of the heat pipe.

To have used a valve in Komino, in the connection pipe (124) between the evaporator section (40A of Komino) and the condenser section (40c of Komino) for the purpose of allowing improved control of the heat pipe would have been obvious in view of the teaching of Shlosinger. Such a modification would, for example, advantageously reduce heat transfer from the heater 24 to the heat sink 44 during wafer baking modes when no cooling of the wafer is necessary, thereby advantageously saving on the amount of cryogen 44 needed to operate the device.

Regarding the limitation that the entire inside of the evaporator section (40A) of Komino be covered with wick material this is deemed to be fairly taught by both Komino (the entire document) and Shlosinger (the entire document) and if need be by Oi, Figures 5 and 6. Such wicking over all sections of the evaporator advantageously distributed liquid evenly so that there are no "hot-spots".

Claims 4, 5 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over over the combined teachings of Komino (JP 5-315293) and Shlosinger (USP 3,543,839) and optionally Oi (JP 8-29080) as applied to claim 3 above, and further in view of JP 2-126049.

JP '049 teaches two valves 16 and 17 in the respective connection pipes between the evaporator and condenser of a loop-type heat pipe such as shown in Komino. Such a set of two valves would more positively cut-off undesirable flow between the

evaporator and condenser than would the single valve of Shlosinger and would have been obvious to have used in Komino to take advantage of that improved ability to cut-off flow. Such a modification would, for example, advantageously reduce heat transfer from the heater 24 to the heat sink 44 during wafer baking modes when no cooling of the wafer is necessary, thereby advantageously saving on the amount of cryogen 44 needed to operate the device.

Claims 1, 2, 3, 4, 5, 9, 10, 16, 21 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combined teachings of Komino (JP 5-315293) and Kawai (JP 5-99580) and optionally Oi (JP 8-29080).

Komino in Figure 5 shows a heat pipe (40A), a wafer W, a heater (24), a wick (96), a predetermined amount of working fluid (42), a cooling system (in the vicinity of and surrounding elements 44 and 40c) and connection pipes (122 and 124). No valve is shown in either of the connection pipes.

Kawai in Figure 7 teaches, in a heat pipe structure identical to the one shown in Figure 5 of Komino, using two check valves (7), one in each of the connection pipes between the evaporator section 4 (corresponding to 40A of Komino) and the condenser section 5 (corresponding to 40c of Komino) for the purpose of allowing improved control of the heat pipe by ensuring circulation in only one direction (i.e. no reverse flow).

To have used two such check valves in Komino, one in each of the connection pipes (122 and 124) between the evaporator section (40A of Komino) and the condenser section (40c of Komino) for the purpose of allowing improved control of the heat pipe would have been obvious in view of the teaching of Kawai. Such a modification would, for example, advantageously prevent the device from starting up with the working fluid flowing in the wrong direction.

Regarding the limitation that the entire inside of the evaporator section (40A) of Komino be covered with wick material this is deemed to be fairly taught by Komino (the entire document) and if need be by Oi, Figures 5 and 6. Such wicking over all sections of the evaporator advantageously distributed liquid evenly so that there are no "hot-spots".

Claims 11-13 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

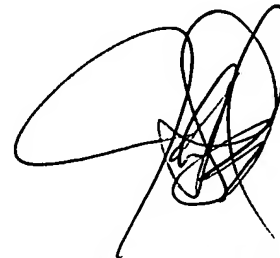
THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not

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mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication should be directed to John K. Ford at telephone number 571-272-4911.

A handwritten signature in black ink, appearing to be 'John K. Ford', with a large, loopy flourish extending from the top left.

John K. Ford
Primary Examiner